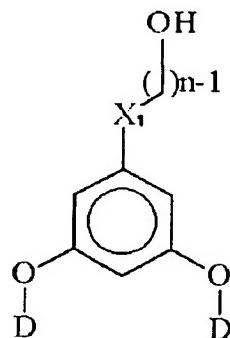


What is claimed is:

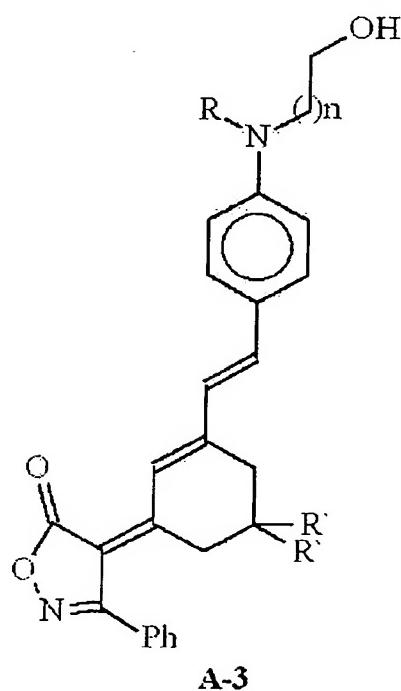
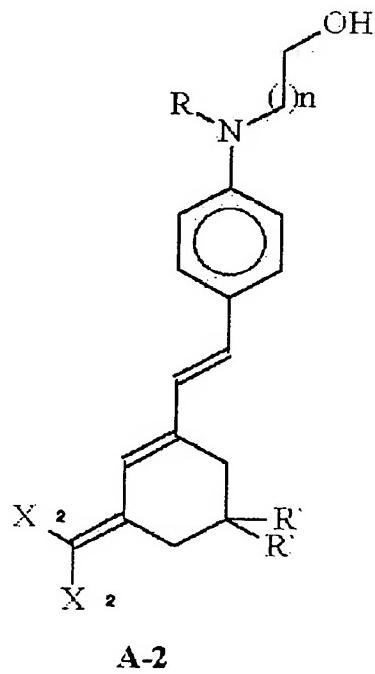
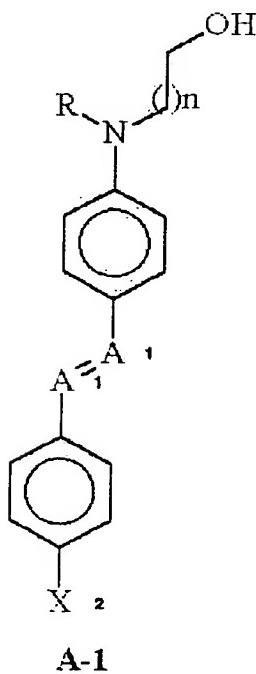
1. An organic dye molecular material having the following formula:



where  $X_1$  is hydrocarbon, oxygen, sulfur, nitrogen, ester ( $CO_2$ ), or amide ( $CONR_1$ ),

where  $R_1$  is an alky or phenyl group having 1 to 6 carbon atoms, D is an organic chromophore molecule, and  $n$  is an integer from 1 to 10.

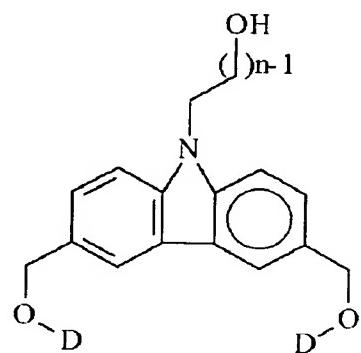
2. The organic dye molecular material of claim 1, wherein the organic chromophore molecule D has a structure selected from the following formula (A-1), (A-2) and (A-3) in which each chromophore molecule is shown as D-OH:



where R and R' are each independently alkyl or phenyl groups having 1 to 10 carbon atoms, A<sub>1</sub> is carbon or nitrogen, X<sub>2</sub> is NO<sub>2</sub>, a sulfonyl-substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, CN, -C(CN)=C(CN)<sub>2</sub>, an ester group, a carbonyl group, a halogen element, or a haloalkyl group, and n is an integer from 1 to 11.

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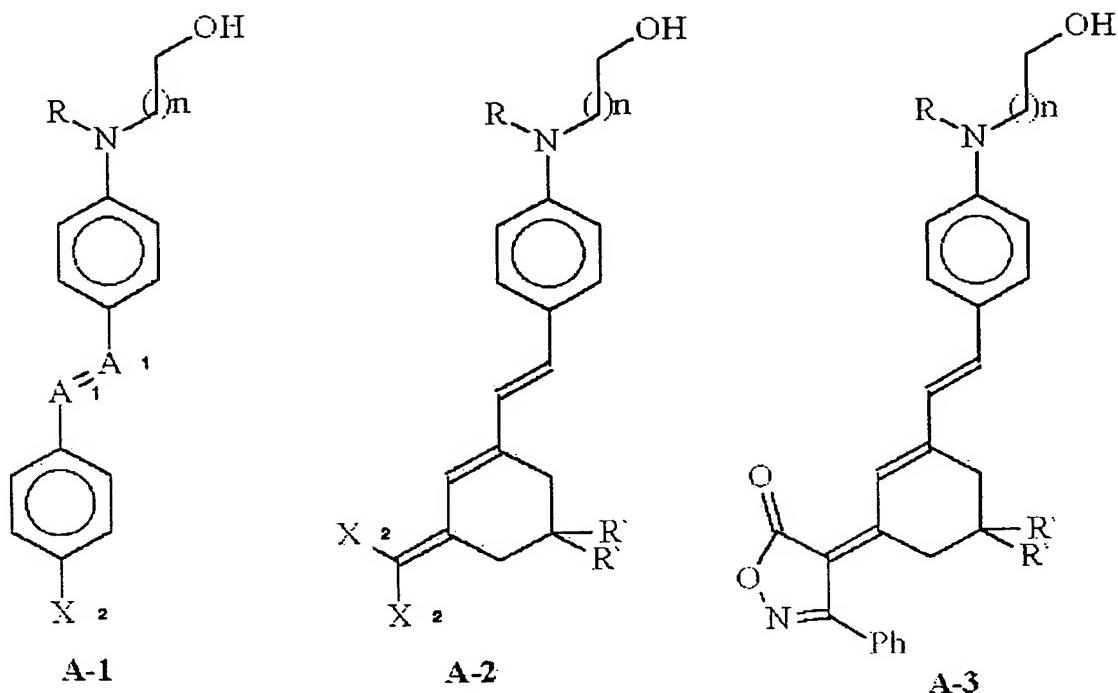
3. An organic dye molecular material the following formula:



where D is an organic chromophore molecule, and n is an integer from 1 to 10.

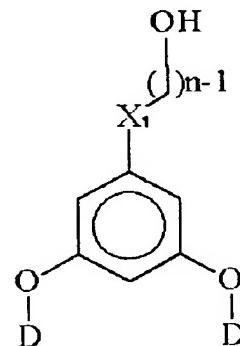
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4. The organic dye molecular material of claim 3, wherein the organic chromophore molecule D has a structure selected from the following formula (A-1), (A-2) and (A-3) in which each chromophore molecule is shown as D-OH:



where R and R' are each independently alkyl or phenyl groups having 1 to 10 carbon atoms, A<sub>1</sub> is carbon or nitrogen, X<sub>2</sub> is NO<sub>2</sub>, a sulfonyl-substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, CN, -C(CN)=C(CN)<sub>2</sub>, an ester group, a carbonyl group, a halogen element, or a haloalkyl group, and n is an integer from 1 to 11.

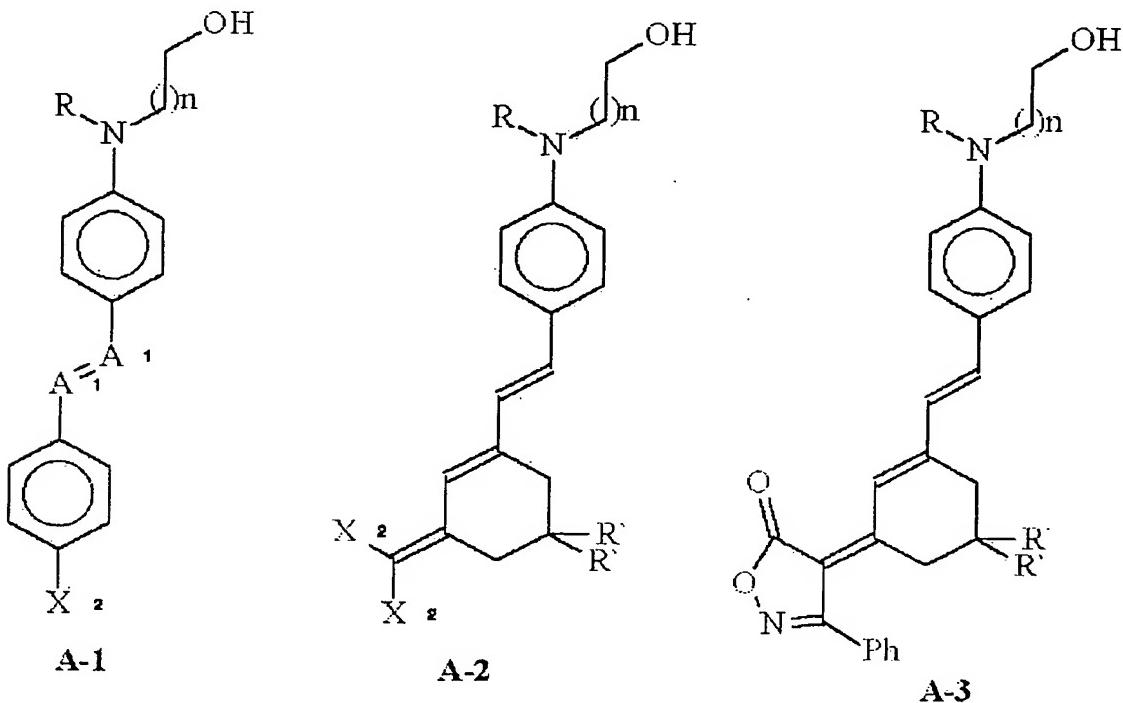
5. An optical polymeric compound containing polyimide repeating units to which an organic dye molecular material having the following formula is coupled:



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where X<sub>1</sub> is hydrocarbon, oxygen, sulfur, nitrogen, ester (CO<sub>2</sub>), or amide (CONR<sub>1</sub>), where R<sub>1</sub> is an alkyl or phenyl group having 1 to 6 carbon atoms, D is an organic chromophore molecule, and n is an integer from 1 to 10.

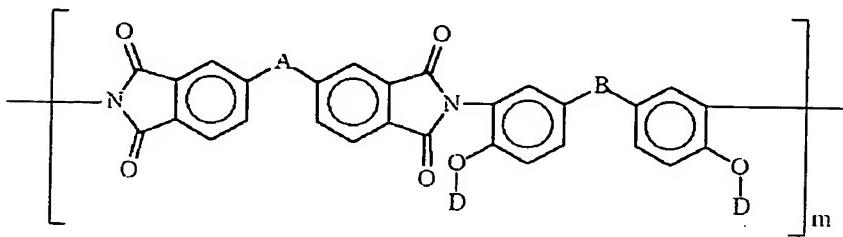
6. The optical polymeric compound of claim 5, wherein the organic chromophore molecule D has a structure selected from the following formula (A-1), (A-2) and (A-3) in which each chromophore molecule is shown as D-OH:



where R and R' are each independently alkyl or phenyl groups having 1 to 10 carbon atoms, A<sub>1</sub> is carbon or nitrogen, X<sub>2</sub> is NO<sub>2</sub>, a sulfonyl-substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, CN, -C(CN)=C(CN)<sub>2</sub>, an ester group, a carbonyl group, a halogen element, or a haloalkyl group, and n is an integer from 1 to 11.

7. The optical polymeric compound of claim 5, having a homopolyimide backbone.

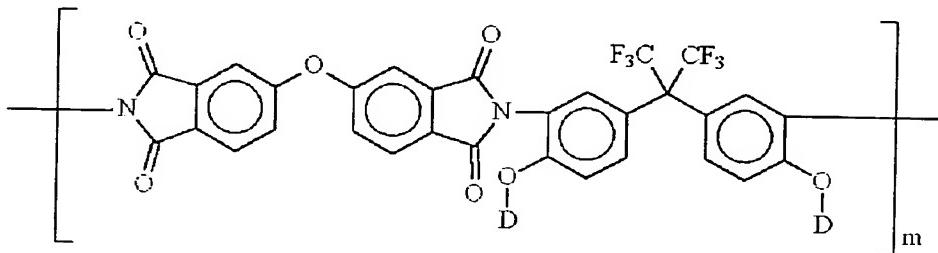
15 8. The optical polymeric compound of claim 5, wherein the polyimide repeating unit has the following formula:



where A and B are each independently fluorocarbon-substituted or unsubstituted hydrocarbons having 1 to 4 carbon atoms, oxygen, nitrogen, or sulfur, and m is in the range of 0.01 to 1 as the ratio of the polyimide repeating units to all the repeating units of the optical polymeric compound.

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9. The optical polymeric compound of claim 8, wherein the polyimide repeating unit has the following formula:

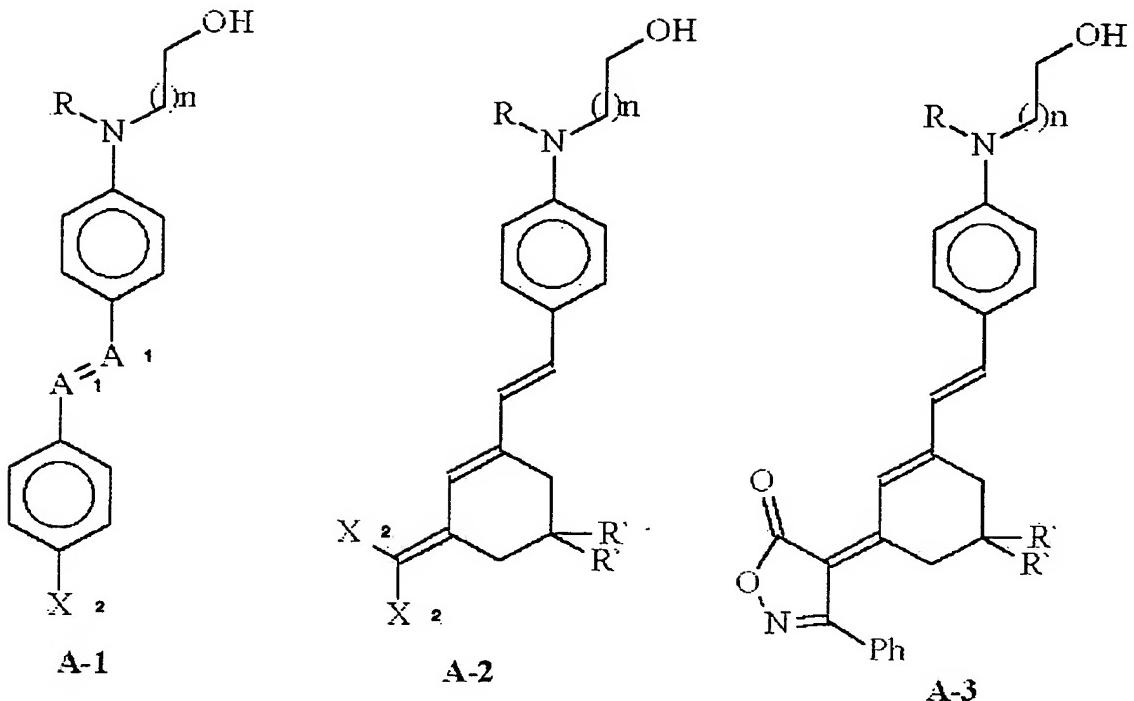


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10. The optical polymeric compound of claim 8, wherein the polyimide repeating unit contains 10-60 % by weight the organic chromophore molecule D.

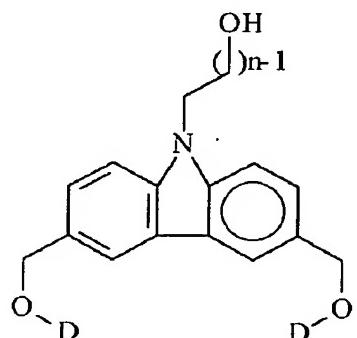
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11. The optical polymeric compound of claim 8, wherein the polyimide repeating unit is coupled with at least one organic chromophore molecule selected from the group of organic chromophore molecules having the following formula (A-1), (A-2) and (A-3) in which each chromophore molecule is shown as D-OH, or with a combination of the organic chromophore molecules in a predetermined ratio:



where R and R' are each independently alkyl or phenyl groups having 1 to 10 carbon atoms,  $A_1$  is carbon or nitrogen,  $X_2$  is NO<sub>2</sub>, a sulfonyl-substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, CN, -C(CN)=C(CN)<sub>2</sub>, an ester group, a carbonyl group, a halogen element, or a haloalkyl group, and n is an integer from 1 to 11.

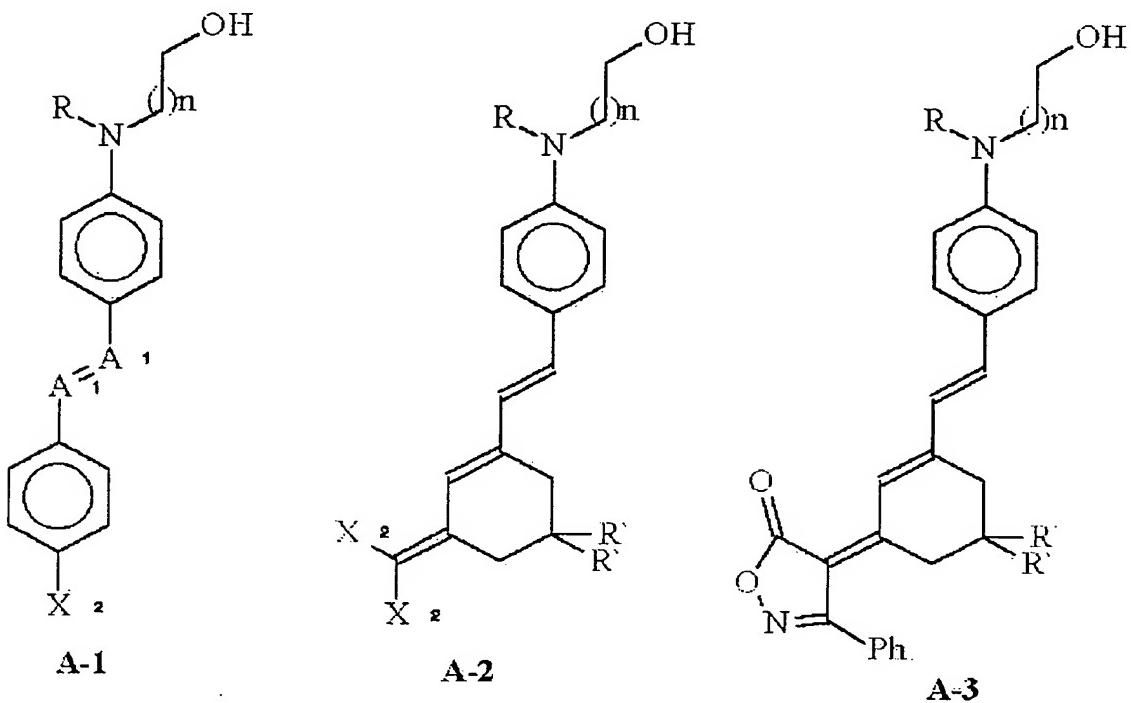
12. An optical polymeric compound containing polyimide repeating units to which an organic dye molecular material having the following formula is coupled:



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where D is an organic chromophore molecule, and n is an integer from 1 to 10.

13. The optical polymeric compound of claim 12, wherein the organic chromophore molecule D has a structure selected from the following formula (A-1), (A-2) and (A-3) in which each chromophore molecule is shown as D-OH:

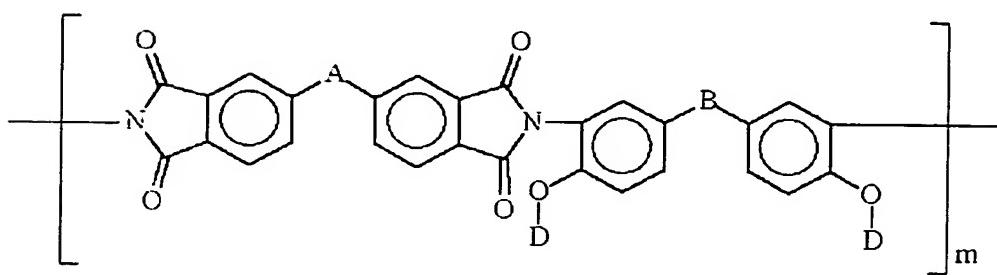


where R and R' are each independently alkyl or phenyl groups having 1 to 10 carbon atoms, A<sub>1</sub> is carbon or nitrogen, X<sub>2</sub> is NO<sub>2</sub>, a sulfonyl-substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, CN, -C(CN)=C(CN)<sub>2</sub>, an ester group, a carbonyl group, a halogen element, or a haloalkyl group, and n is an integer from 1 to 11.

14. The optical polymeric compound of claim 12, having a number average molecular weight of 5,000-500,000.

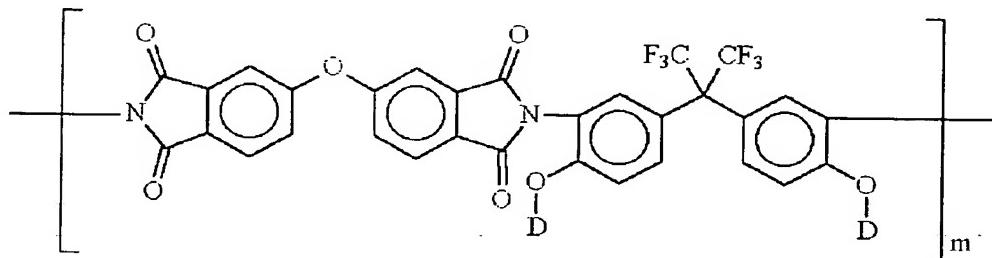
15. The optical polymeric compound of claim 12, having a homopolyimide backbone.

16. The optical polymeric compound of claim 12, wherein the polyimide repeating unit has the following formula:



where A and B are each independently fluorocarbon-substituted or unsubstituted hydrocarbons having 1 to 4 carbon atoms, oxygen, nitrogen, or sulfur, and  $m$  is in the range of 0.01 to 1 as the ratio of the polyimide repeating units to all the repeating units of the optical polymeric compound.

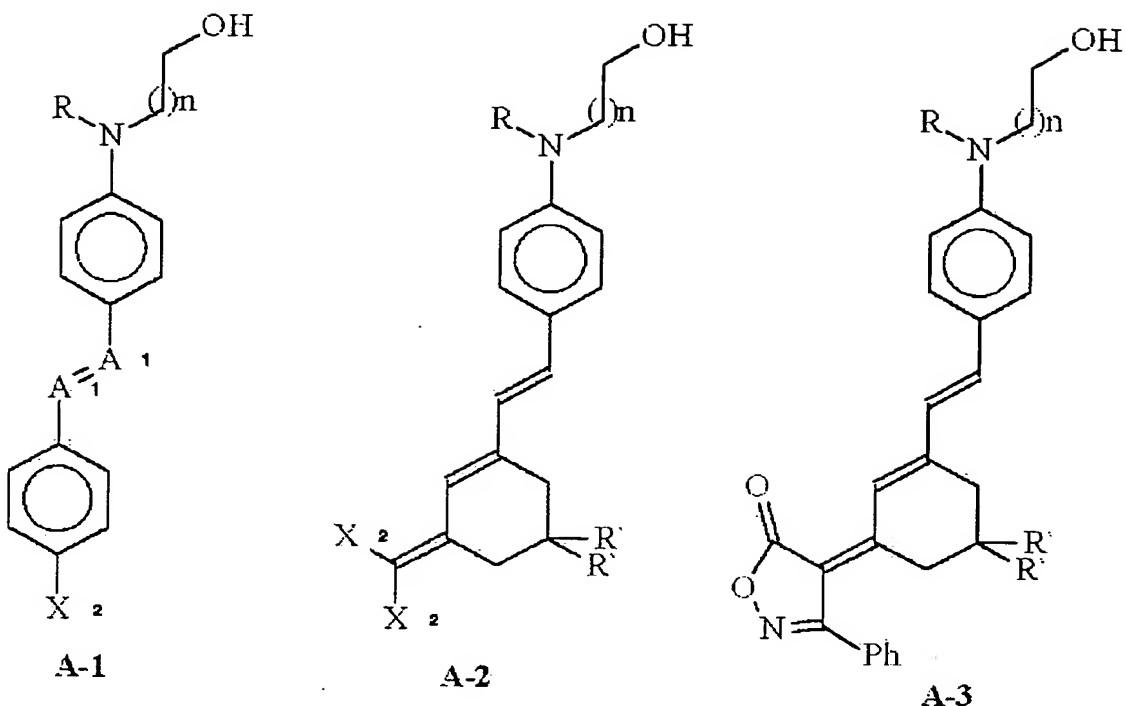
17. The optical polymeric compound of claim 16, wherein the polyimide repeating unit has the following formula:



18. The optical polymeric compound of claim 16, wherein the polyimide repeating unit contains 10-55% by weight the organic chromophore molecule D.

19. The optical polymeric compound of claim 16, wherein the polyimide repeating unit is coupled with at least one organic chromophore molecule selected from the group of organic chromophore molecules having the following formula (A-1), (A-2) and (A-3) in which each chromophore molecule is shown as D-OH, or with a combination of the organic chromophore molecules in a predetermined ratio:

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where R and R' are each independently alkyl or phenyl groups having 1 to 10 carbon atoms, A<sub>1</sub> is carbon or nitrogen, X<sub>2</sub> is NO<sub>2</sub>, a sulfonyl-substituted or unsubstituted alkyl group having 1 to 10 carbon atoms, CN, -C(CN)=C(CN)<sub>2</sub>, an ester group, a carbonyl group, a halogen element, or a haloalkyl group, and n is an integer from 1 to 11.